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GAS HEAT *in* INDUSTRY

Vol. XIII June, 1950 No. 153

Manufacture of Road Vehicle Springs

Welsh Factory Relies on Gas

THE manufacture and repair of laminated springs and the manufacture of hot coiled springs, with the numerous heating processes involved, all calling for the highest precision in firing temperatures, provide yet another example of an industry which makes the fullest use of gas as a heating agent. In the Rhondda Valley factory at Llwynypia of the Bramber Engineering Co. Ltd. one finds the only industry of its type in Wales and here there is an almost entire dependence upon gas for the mass production of both these types of road vehicle springs.

The gas used is supplied through an 8 in. main at the rate of approximately 11,000 c. ft. per hour although when peak production is reached it is estimated that this figure will be increased by at least another 6,000 c. ft. per hour. A 6 in. main pipe line runs throughout the factory and this is "tapped down" to 4 in. or 2 in. according to the gas requirements of the furnaces.

Ten gas-fired ovens are in operation each with a controlled gas and air supply and equipped with pyrometers and recorders. With all these furnaces in use the firm is able to turn out 6,000 coil and 3,000 laminated springs of the normal size weekly. In the manufacture of laminated springs the silico-manganese steel is used in its as-rolled condition and a major process is the forging operations of the spring leaves.

This forging operation which is

MAIN FEATURES IN THIS ISSUE

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Fig. 1. J. L. Smith hot air circulating furnace

carried out in gas-fired forging furnaces 5 ft. long and 2 ft. wide calls for high precision work. The further precision which is required in firing temperatures is exemplified in the cambering and hardening processes for which a gas-fired 7 ft. × 3 ft. oven is employed to heat the steel to 900-925° C. A similar sized oven is used at 480-500° C. when the leaves are tempered. This oven, which is illustrated in Fig. 1 is a J. L. Smith hot air circulating furnace complete with pyrometer and ether recorder. The spring leaves are placed on trolleys which have four trays mounted

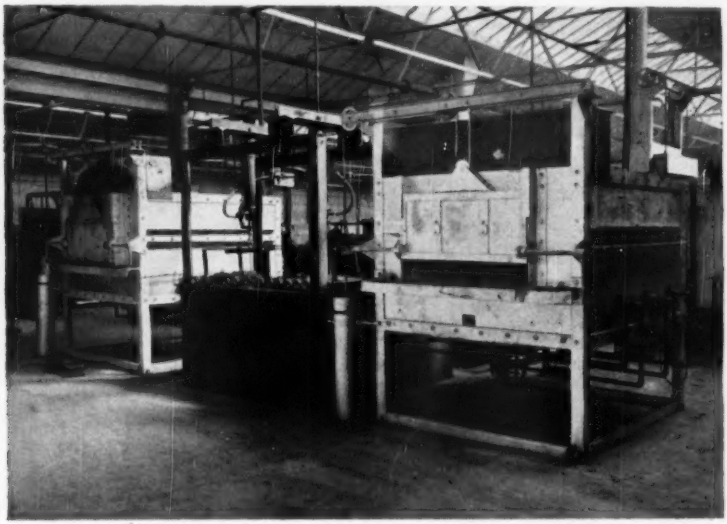


Fig. 2. A group of furnaces supplied by Kasenit Ltd. of London. Between the two furnaces is the quenching tank used for hardening of coil springs.

in each. The brinell range of temperature obtained on material tempered in this furnace is guaranteed within the usual range for silico-manganese steel springs, i.e. 388-444 brinell figures, which clearly indicates how gas can be used where uniform treatment is demanded.

An important part of the process in coil spring manufacture is the heating for coiling which is done in a furnace of 40 sq. ft. and another gas-controlled oven 6 ft. × 3 ft. heats these springs again at 900-925° C. in preparation for oil quenching.

Fig 2 shows a group of furnaces supplied by Kasenit Ltd. of London, and between the two furnaces can be seen the quenching tank which is used for the hardening of coil springs. A 4 in. pipe delivers the gas to the furnace which is fitted with a Satchwell air and gas control unit. These furnaces are also fitted with Ether recorders. Throughout the whole of the processing of this type of spring gas functions right up to the penultimate operation of stove enamelling before the springs reach the packing bay. This operation subjects the spring to enamelling for 60 minutes at 300° C.

Gas is also used for domestic purposes in the factory, when two gas cookers and a 3 ft. square grill and toaster are in daily use to supply meals for 240 employees in the works canteen.

Printing Ink Varnish Production

THE American Lithographic Varnish Co., of New Jersey, principal product is lithographic varnish, the main vehicle for printing inks. In addition, however, it is noted for a range of special varnishes, compounds and driers for the printing ink manufacturer. These include gloss varnishes, scratch proof varnishes, overprint varnishes, heat set and steam set varnishes, typographic varnishes, alkyd, metallic and hot wax varnishes, hard binding varnishes, cobalt driers and paste driers, as well as numerous varnishes made to the specifications of prospective users.

With this complexity of products in mind, the company in undertaking an expansion and modernisation plan gave considerable thought to the use of both oil and gas as a replacement for the coke which had been used for so many years.

Because of the multiplicity of required characteristics it was decided that gas-fired units could more easily accomplish these results as compared to the lengthy and tedious processes necessitated by the use of coke-fired units.

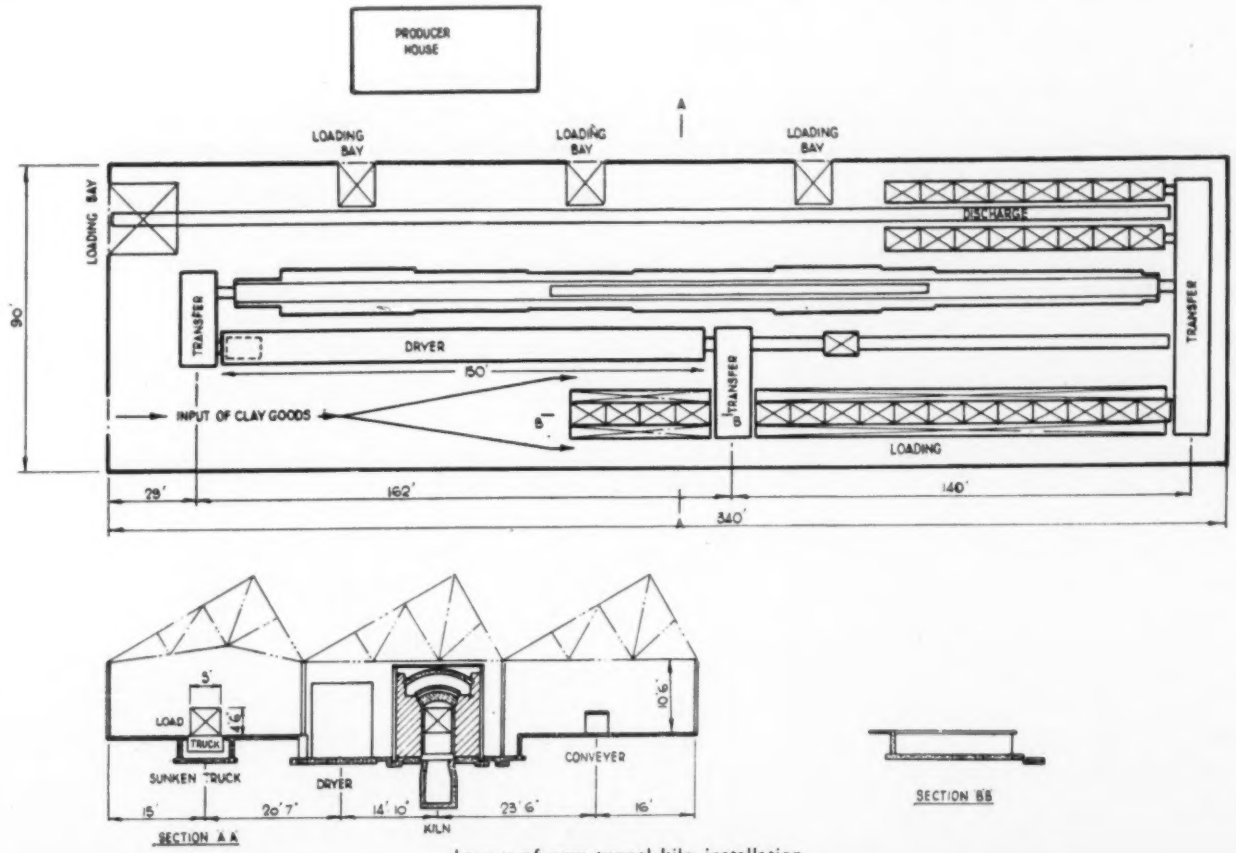
After studying figures on comparative efficiencies and inspecting existing installations it was decided to install six Selas radiant cup fires. Two Bryant Flo-Mixers are used on each fire. This provides the close control which is so important when the batches have reached the final temperature or where various resins and other compounds must be incorporated to impart specific desired characteristics.

Overhead piping keeps the zero gas governors in a cool zone and permits easy servicing if necessary. The flanged construction of the Bryant Flo-Mixers facilitates their rapid removal if the occasion for any servicing of these units arises. Operation is simple and gauges showing mixture pressure provide an easy check on past performance.

It is now felt that the uniformity of products will be easier to maintain and many of the production headaches eliminated through the use of this modern gas installation.

(*Industrial Gas, U.S.A.* April, 1950)

Chemical Research Laboratory.—The Chemical Research Laboratory, D.S.I.R., at Teddington, Middlesex, is again holding a series of "Open Days" this year. There will be four sessions, on 28th June (afternoon), 29th June (afternoon), and on 30th June (morning and afternoon). The afternoon of 28th June has been set aside for representatives of industrial firms who have not previously received invitations and the director would be glad to receive applications from firms up to 19th June.



Layout of new tunnel kiln installation

Loading trucks with green refractory specials. Dryer entrance in background

New Tunnel Kiln For Refractory Special Installations

At Gibbons (Dudley) Ltd.

SINCE the summer of 1949 Gibbons (Dudley) Ltd. have had in full production at their refractory firebrick works a new tunnel kiln, designed and built by their associate company Gibbons Brothers Ltd., who specialise in tunnel kiln installations. The plant being of the most advanced type, no doubt a description of its main features will be of interest to refractory manufacturers.

Layout

The layout consists of a three-bay building housing a tunnel dryer 160 ft. long, a tunnel kiln 310 ft. long, two loading tracks, two unloading tracks, and a rubber belt conveyor for transfer of fired goods from the unloading tracks to the various sections of the stocking bay.

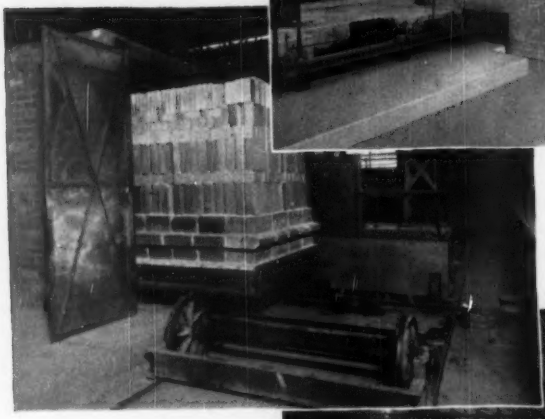
The unfired shapes are brought from the adjacent moulding floors to the loading bay by a 2-ton capacity electric truck, the goods being just sufficiently dry to enable them to withstand setting on the kiln trucks without squatting. A very large range of sizes is handled ranging from small specials, regenerator tubes, muffle chamber fronts, to large and solid specials 8 in. thick, weighing up to 155 lb. Weekly production runs at 207 tons burnt weight.

Fabricated steel construction has been employed for the kiln trucks which are 9 ft. 10½ in. long and 6 ft. wide; the load carried being 5 ft. wide by 5 ft. high, set directly on the truck brickwork. One truck enters the kiln every five hours fifteen minutes, propulsion through kiln being by continuously moving hydraulic pusher.

In view of the heavy weight of the loaded trucks, which average about 12 tons, the three transfer trucks

(Left) Loaded trucks being transferred to tunnel dryer by means of electric transfer truck. Mechanical pusher is shown in foreground

(Right) View of entrance end of kiln, showing hydraulic pusher, electric truck and dryer exit



(Left) Truck of fired specials being drawn from kiln by electric winch

(Right) Fired trucks being unloaded on to a rubber belt conveyor

are electrically driven and fitted with powerful winch gear for moving trucks into and out of dryer and kiln. Trucks are moved along the four tracks by means of twin cable haulage gears, the provision of complete mechanical handling making it possible to work the dryer and kiln with one operator only.

Dryer Details

The dryer is 160 feet long, giving a drying cycle of 84 hours. It is worked entirely with clean hot air recuperated from the kiln cooling zone. The provision of a recirculating circuit fitted with a fan handling moist exhaust air ensures a very satisfactory control of the temperature — humidity cycle. Goods leave the dryer in a completely dry state at 100° C., and are transferred without loss of time to the entrance air lock of the kiln which is maintained hot by recirculation of hot air from the cooling zone. This air lock is isolated from the kiln tunnel during transferring of trucks by means of a flexible roller shutter, in order to avoid loss of kiln draught while the kiln door is open.

In order to ensure complete combustion of the high percentage of carbonaceous matter in the fireclay, the kiln is worked with a very extended preheating period from 900° C. to 1,000° C.; the atmosphere being maintained very highly oxidising throughout the entire length of the kiln. A battery of 30 burners is fitted to the kiln, all supplied with washed coke producer gas from a fully-duplicated Gibbons-Heurtey producer plant. These producers are of the self steaming type, fitted with coke elevator, conveyor and bunker gear.

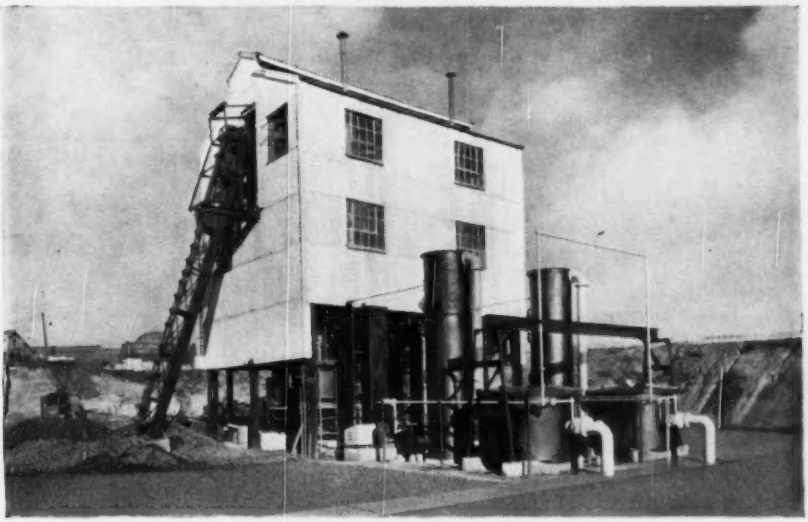
Heat Distribution

Hot air for the burner system is supplied under pressure from a fan drawing air directly from the kiln cooling tunnel and further preheating this air by passing it behind a heating panel set in the rapid cooling zone.

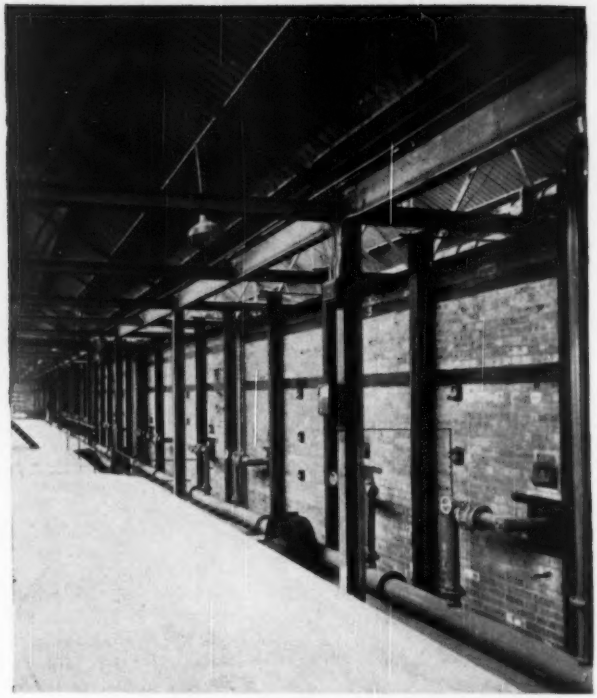
Two sets of Phillips high temperature recirculators with heat resisting alloy fans and aluminised ducts ensure good heat distribution in the preheating zone, in the 450° C. to 650° C. region.

The main zone is constructed in 95 per cent. silica brick and designed for a temperature of 1,500° C. if ever required. Provision has also been made for firing with liquid fuel, if desired, at a later date.

The goods are fired to Seger Cone 12, on a 157 hour cycle, and the uniformity of firing is remarkably good for all sizes and types of specials. Although only manually controlled,



Twin gas producer installation with elevator and washing equipment



Side view of tunnel kiln, showing gas main and burner system

the kiln runs with perfect consistency and requires but little attention. Burnt losses from all causes run regularly at ½ per cent. and fuel consumption is a consistent 33 to 34 tons of coke per week.

Cooling

Cooling of the goods takes place in 38 hours, and is carried out in a cavity panel section, the tunnel of which is supplied with cold air by a large fan. Hot air for the dryer is tapped off from the cooling zone and the cavity walls, passed over the main arch of the kiln and blown to the dryer. The cooling zone of the kiln is so efficient that the goods come out at little more than atmospheric temperature, and can be handled immediately.

An interesting feature is the provision of a spacious under car tunnel 95 ft. long under the high temperature section of the kiln, primarily for use in the event of movement of truck load and this is particularly useful for checking behaviour of truck running gear at maximum temperature, condition of sand seal, and other vital points.

MORGAN CRUCIBLE CO. LTD.

WE have received two interesting leaflets from the Morgan Crucible Co. Ltd., Battersea Church Road, S.W.11.

One, R.D.18, describes the new service which the company is offering for their Triangle refractory materials, which include cements, jointings, furnace-wall washings, rammings, patchings and refractory concrete mix.

With Triangle refractory concrete mix, it is possible to cast special refractory shapes which are ready in twenty-four hours with no prefiring required.

Details are provided on the use of this concrete mix, together with its properties. The material is recommended for temperatures up to 1,350° C.

The information is provided in leaflets R.D.6 and R.D.18.

Power Jacks Ltd.—Power Jacks Ltd. announce the appointment of a London main distributor for the Newton Hydra-truck.—Norman Stanley and Co., 56 Marshall Drive, St. Albans, Herts. Telephone: St. Albans 5214.

Planning and Designing Hotel Kitchens

by

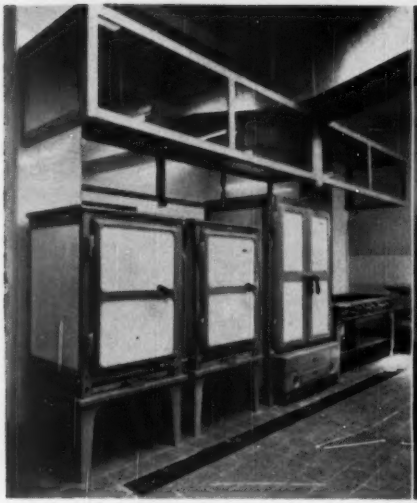
J. ROWLAND
Torquay Sub-division South Western Gas Board

This paper has been prepared from experience gained over a period of years in planning and designing kitchens in the Torquay area, where the chief occupation is the hotel and catering industry

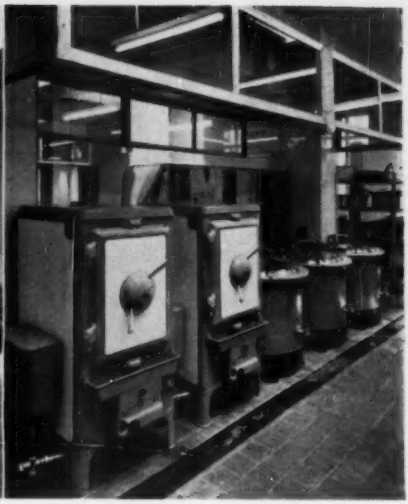
PERHAPS there is no service to gas consumers as interesting and requiring more imagination, enterprise and careful thought, than that of planning and designing a hotel kitchen. There is great satisfaction in creating an attractive and efficient catering unit and watching it operate with clocklike precision from the stores entry to the dining-room.

Although we are primarily concerned with the planning of hotel kitchens, my remarks can also be applied, to a large extent, to restaurants and industrial canteens. It should be remembered that certain adaptations of equipment might be necessary, depending upon the duration of service, type of meals, and the number of courses to be served.

Looking into the main kitchen through the waiters' service hatch at the Palace Hotel, Torquay



Roasting ovens and a Chester boiling table



Keswick roasting ovens and Lune vegetable boilers

Preparing the Plan

From the outset, and before committing any details to paper the following essential principles must be borne in mind.

(a) Ease of movement of supplies from the goods entrance through all phases of preparation, to the servery and the dining-room.

(b) Elimination of unnecessary movement by the kitchen staff.

(c) Arrangement of travel of the kitchen staff to ensure they do not obstruct each other's movements.

(d) Planning the whole catering establishment in such a way that the raw materials are as speedily as possible converted into attractive and palatably cooked food with the minimum of labour.

Establishing the Size and Type of Kitchen

The next step is to establish the size and type of kitchen required. To do this it will be necessary to obtain the following information:—

1. The number and type of meals to be served.
2. The number of sittings or shifts.
3. The type of fuel; whether gas or gas and steam; the steam being supplied, in the case of an industrial kitchen, from the works or possibly from a gas-fired steam boiler
4. Details of existing gas, steam or electrical supplies.
5. The type of catering establishment desired; whether, in the case of a restaurant or canteen,
   (a) Cafeteria style, or
   (b) Waitresses.
   or in the case of a hotel, whether a silver service is to be provided.
6. Next, obtain a plan of the kitchen quarters or of the proposed new accommodation. If a plan is not available a site survey should be made in order that a working plan for designing the lay-out may be prepared. In preparing the plan of the site it is important to note the height of the kitchen, as this will affect the decisions to be made regarding lighting and ventilation.
7. Establish the position of the dining-room in relation to the kitchen. If the dining-room is on a different floor provision should be made for service lifts.
8. If steam is to be used, the total steam requirements should be established.
9. Ascertain whether the quotation is to included erection, fixing and gas supply.
10. Enquire regarding ventilation. Is it to be:—
    (a) Natural or mechanical

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(b) Independent or incorporated into a general ventilating scheme for the whole building.

11. Find out the flue positions and sizes.
12. If sinks and woodwork are to be included, the sizes and positions of existing drains should be known.
13. Enquire when the completed proposals will require to be ready, and, if accepted the date on which completion of the work is desired so that appropriate arrangements can be made to secure delivery of appliances in good time.
14. Obtain the compass bearing of the building in order to plan the most suitable position for the dining-room and cold stores.
15. Know the finish and colour in which the appliances and equipment are desired.

Study the Catering Services

A well planned kitchen commences at the stores entrance, and ends only with the satisfied guests in the dining-room.

Let us now consider the various stages in the development of a smooth running kitchen service. This service develops in the following stages:—

Delivery
Storage
Preparation
Cooking
Serving
Washing up

and needs in addition attention to

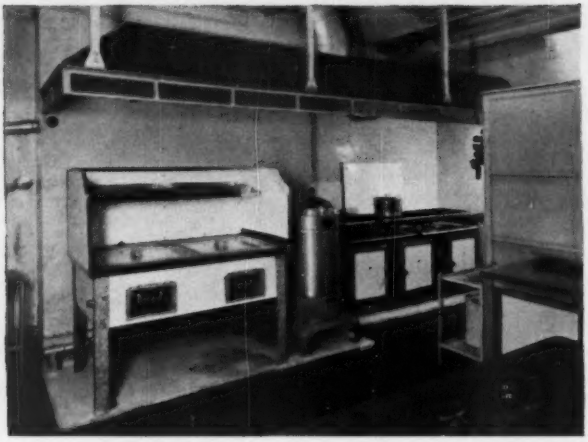
Ventilation and
Hot Water Supply.

Delivery

Provision must be made for an adequate and unrestricted thoroughfare for the initial delivery of all raw materials, preferably away from the main entrance of the hotel.

Storage

The stores must be planned to facilitate quick delivery, and easy issue to the appropriate preparation departments. Provision should be made for separate storage of vegetables, meat, fish, dry goods, and if the hotel is licensed, a wine cellar will also have to be incorporated.



Double pan fish fryer, Rotapan and treble oven range

The vegetable store must be equipped with suitable racks and bins.

Adequate cold storage for meats with a separate compartment for fish requires to be provided. The cold store should have direct access from the larder.

Large establishments may require a bulk cold store in addition to a cold store for daily issues.

To estimate the size of cold room required the following is a guide:—

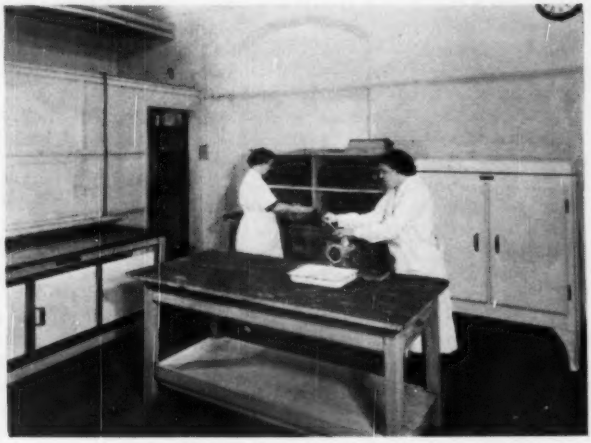
A cold room of approximately 500 c. ft. capacity will store 1,600 lb. meat and 4,000 lb. of general produce. The dry goods store should be adequate size and equipped with shelves and bins.

In most large establishments a storekeeper's office, equipped with a weighing machine for checking deliveries, should be situated near the stores.

Preparation

Preparation departments must be planned so that prepared food may easily and quickly move to the cooking departments. In small hotels the preparation departments may be contained in the same room as the cooking equipment, but in larger establishments provision must be made for separate preparation rooms.

Depending upon the size and shape



Gas hot cupboards and L.1000 refrigerator

PLANNED HEATING AND VENTILATING

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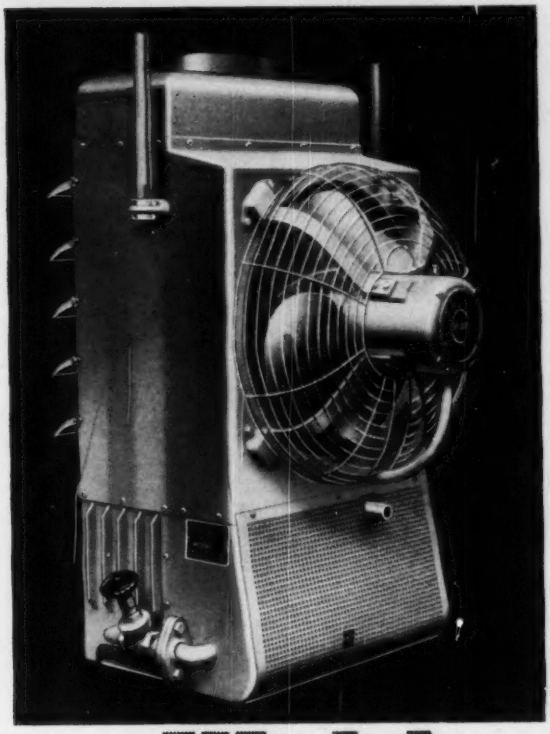
Weldex Gas Fired Heaters are only available at the present in one size, namely to give 94,000 B.Th.U. (with gas of 475 calorific value) per hour; sufficient for approx. 25,000 cubic ft. of room space.



The heating element is made from stainless steel to ensure long life.

They are fitted with automatic control cut outs to render them safe in the event of failure in gas or electrical supplies.

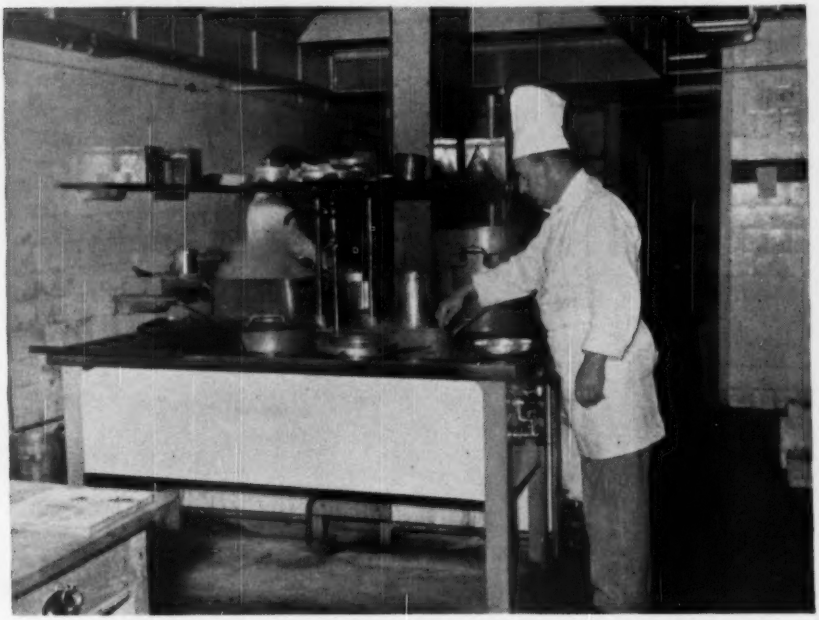
Operation of these units during the normal working period can be simply effected by switching on and off the electrical supply and, therefore, can be satisfactorily controlled by a standard thermostat if required.

Weldex HEATERS

FOR SPECIALIST INSTALLATIONS

WELDEX HEATERS WELLINGTON TUBE WORKS LTD GREAT BRIDGE STAFFORDSHIRE

of the kitchen, the cooking equipment may be grouped centrally with the preparation benching arranged around the walls, or wall type ranges may be used with preparation tables in the centre. If space permits, the central grouping is to be preferred to facilitate all-round cleaning, but in either case it is always advisable to recommend that floor type ranges are fixed on a slightly raised plinth to avoid waste being kicked under the ovens. The various items of cooking equipment may be grouped together, or the vegetable, fish and pastry cooking may be situated in proximity to their respective preparation departments.



The chef de cuisine in the main hotel kitchen at a Grosvenor Central Range

Equipment Required

Ovens. These may be fitted with either solid or open type hotplates above the ovens; if solid type hotplates are preferred, at least one open type hotplate should be provided for every five solid type hotplates. Raised ovens, either two tier or single ovens on stands may be recommended to avoid stooping, and if this arrangement is adopted, provision must be made for an equivalent number of solid or open type boiling tables. Consideration should also be given to supplying separate roasting ovens.

Steamers. These are used for cooking vegetables, puddings and fish. There are various types of steaming ovens available, either separate compartments fitted in tiered formation, or multi-compartment ovens fitted side by side. Where more than one steaming oven is provided, one should be used for fish only.

Boiling Pans. Generally these are included for the bulk cooking of green vegetables. If the boiling pan is of the jacketed type, it may be used for milk and soup heating.

Grillers. Sizes of grillers usually range from 18 in. wide to 36 in. wide measuring internally. The 36 in. wide size may be fitted with a division to form two compartments. Grillers are fitted with solid cast iron fluted branders for grilling steaks, fish, bacon, etc. The kitchen griller should be sited adjacent to the servery or the service lift for salamandering. The griller itself may either be supplied with a 45 in. high stand or be provided with brackets for wall fixing.

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Illustration of a Town Gas-Fired Galvanising Bath 12′ 0″ × 5′ 6″ × 4′ 6″.

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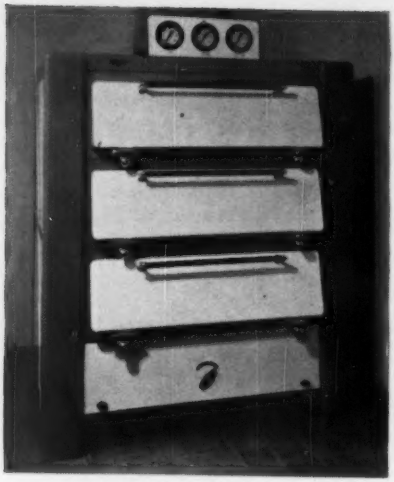


Convector pastry oven

Fish Fryers. In all except small hotels, a double compartment fryer should be provided. The fryer may be fitted with screens or preferably a ventilating canopy fitted as an integral part of the appliance.

Hot Closets. These are necessary for keeping cooked food hot, also for pre-heating food containers before transporting the cooked food to the servery.

Bains Marie. Where a central type range is fitted the bain marie forms a part of range and is sited at the end nearest to the servery. The bain marie is used for keeping soups and sauces hot prior to serving.

Stock Pot Stoves. A robust stand fitted with a dual ring burner should be provided to heat the large stock pots generally used in hotel kitchens. The stock pots should always be fitted with a draw-off tap for emptying purposes.

The Pastry Room

The most suitable oven for pastry cooking is the shallow deck type. Depending upon the demand, the appliance may have two, three or four ovens arranged in tiers, and each should be fitted with a thermometer. In addition to the pastry oven a boiling table is also required for the preparation of icing, colourings, flavourings, etc.

The Still Room

The equipment required for the still room is as follows:—

A boiling table for breakfast and tea cooking.

A toaster fitted at a convenient working height.

An egg poacher, which may or may not be incorporated into the top of the toaster.

A water boiler for tea making Usually the water boiler is fitted with urns on each side for the storage of milk and coffee. The urns may be heated by hot water circulation from the boiler or independently.

The Servery

The main equipment in the servery is the hotcloset fitted with sliding doors, which forms the hot service counter. The top may be plain or partly fitted with carving wells, vegetable containers and a bain marie. It is usual for the chef and part of his staff to be stationed in the servery while the service is in operation and consequently, it is often necessary to provide a griller and boiling table behind the serving counter.

The servery is situated between the cooking departments and the dining-room to enable cooked food to pass swiftly to the table. Positioning ot the servery must be the first consideration when planning the kitchen, because, although the food may be cooked well, the efforts of the chef and his staff will have been wasted, unless it can be conveyed to the table piping hot.

Ventilation

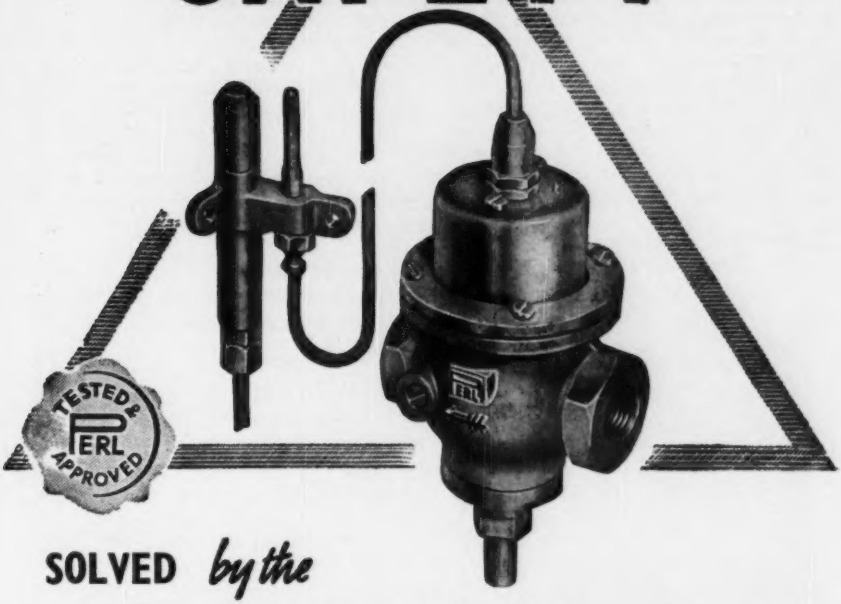
All cooking equipment should be provided with suitable canopies or hoods, connected by ducting to an extraction fan and exhaust shaft. In addition to the removal of cooking smells and products of combustion, thought must be given to the ventilation of the kitchen departments as a whole, so as to effect approximately fifteen air changes per hour for good working conditions. This may be done by ventilating through the canopies only or by providing additional ventilating ducts.

Hot Water Supply

It is essential that all the kitchen

Ignition and Combustion

SAFETY



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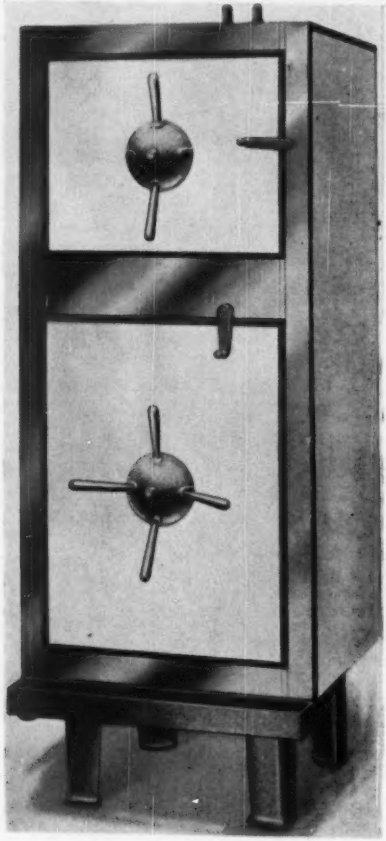
departments be provided with a generous supply of hot water, because nothing is more discouraging to a kitchen staff than to be short of hot water. Hot water may be furnished by the central boiler plant which also supplies the whole hotel, or, preferably by a separate hot water installation for the kitchens only.

Water at a temperature of 140° F. is sufficient for general purposes, but a temperature of 190° F. is required for washing and sterilising table ware. If it is not practical to supply the bulk hot water at this high temperature, then boosting units can be installed to supply the dish washing machine and the crockery sinks.

Situation of Kitchens

The position of the kitchens will depend largely upon the construction of the building. The general working and the movement of food is simplified if the kitchens are on the same level as the dining-room. If situated in the basement, adequate service lifts will be required to transport food to the servery. Where a new building is being planned, or if a suitable conversion is possible in an existing building, consideration should be given to siting the kitchen on the top floor. There are several advantages to this arrangement; these are chiefly that ventilation is simplified, good natural lighting is available, and cooking smells cannot penetrate to the dining-rooms and the remainder of building.



Radiation pressure steaming oven

Choice of Fuel

The next consideration is the choice of the fuel to be used The fuels available are:—

Solid fuel
Heat storage
Electricity
Gas

Solid Fuel. The storage and labour problems and the uncomfortable heat and dirt consequent upon the use of coal has to a very large extent prohibited its application in present day catering establishments.

Coal is still used occasionally in areas which are not favoured with main gas and electricity services.

The heat storage cooker, a modern development of the solid fuel range, is used particularly in areas not served with main services or to deal with the main cooking load where the high cost of other more convenient fuels does not permit their entire use in the kitchen. Here again the storage, labour and dust problems arise.

Electricity. The main advantages are cleanliness and ease of operation. The chief disadvantages are:—

(a) Uneconomical. It is very difficult to train staff in the economical use of electrical cooking appliances. The tendency is to keep the appliance switched on until cooking is completed thereby wasting a considerable amount of fuel.

(b) For many catering purposes, electricity is not quick enough.

Gas. Gas gives the fullest practical service at the lowest possible cost.

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Burners for Food Cooking Ranges
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Yarn Gassing Apparatus and Burners
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Gas supplies all the heat required, exactly as required, with complete flexibility of control and absolute reliability.

Gas causes no delay in lighting, stoking, and ash removal, and saves valuable space necessary for storing solid fuel.

Design of Appliances

It is essential that the kitchen lay-out is not only efficiently planned but is equipped with modern appliances of good design. Most reputable manufacturers are now producing such equipment but there still remains a need to produce "build up" units assembled to conform to the space limitations and to the consumer's requirements.

Although adequate and suitably designed equipment is available for large hotels, much more could be done to satisfy the requirements of the small hotelier or boarding house keeper. Other improvements in the design of catering equipment may be made by incorporating ventilating canopies as an integral part of a central range. The range can be designed to house the necessary extraction fan and motor.

The Use of Gas for Other Services

When planning the kitchen departments of the hotel, thought should also be given to the use of gas for other services in addition to cooking. Briefly these are:—

Domestic water heating for the kitchens and the remainder of the hotel.

Central heating, either by hot water radiators or by a heating and ventilating installation using gas-fired boilers to provide the heat.

Gas fires may be used in conjunction with the central heating installation to provide topping up heat where required or they may be the sole means of heating bedrooms.

Incinerators. Where it is not convenient or hygienic to allow an accumulation of refuse a gas-operated incinerator will dispose of the refuse easily and quickly.

Laundry. If the size of the hotel warrants it, the provision of a laundry supplied with steam and hot water from gas-fired boilers, will ensure that the hotel linen is cleaned quickly, safely and economically.

Section of the Gas Council stand at the 1950 British Industries Fair. Tool hardening furnace on right is by Manchester Furnaces Ltd.

Refractory people made History . . .

King Alfred "reproved" by the peasant's wife for letting the cakes burn. A.D. 878

Outspokenness has always been accounted a virtue, as well as a right, in this country, just as devotion to an ideal has always been accorded respect. Both qualities are remembered as outstanding characteristics of a career — just as over a century's concentration on the production of the most efficient Refractories to meet Industry's many requirements is coupled inseverably with the name GIBBONS.

GIBBONS ***made History with Refractories***

Gibbons (Dudley) Ltd., Dibdale Works, Dudley, Worcs.

Large Scale Dress Manufacture

Gas-fired boilers provide steam requirements

THE Athenia works of Louis Edwards and Co. Ltd., at Maesteg, Glamorgan, produces a quarter of a million garments a year, and our South Wales representative recently had an opportunity to visit this factory and see the operation of what, at first sight, seemed an unusual combination of gas and electricity.

About 20 "steam-electric irons" are in constant use. The dry steam, at a pressure of 60 lb. per sq. in., comes through perforations in the "toe" of the iron. The irons are heated by electric elements, but the foot-operated steam control is used for opening seams and performing many other functions which help to produce the smart finish required by the firm for their products.

Controlled Flame Boiler

In one corner of the factory is the controlled flame gas-fired boiler, fitted with an automatic gas regulator which ensures the accurate control of the gas supply and efficiently develops the application of the heat. The construction of the regulator is such as to allow it to perform these duties for an unlimited time without attention and give the necessary latitude of operative conditions.

When the main gas supply has entered through the inlet port the pressure lifts a leather diaphragm and the gas passes through the outlet port to the burners of the boiler. The pressure-sensitive metal bellows element is connected to the steam space of the boiler, so that the pressure generated tends to cause compression on the bellows.

Two springs keep a relay valve closed so long as the bellows remain at normal length until pressure mounts in excess of that of the two springs causing compression.

The compressed bellows then push the floating relay valve from its seating and a transmission mechanism transfers the main gas supply pressure to the top of the leather diaphragm.

A further finely adjusted piece of mechanism then shuts off the main gas supply.

With the main gas supply off the pressure on the bellows drops and allows the relay valve to close, preventing gas from passing to the top of the diaphragm. The diaphragm then rises allowing the main supply of

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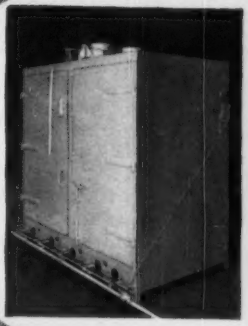
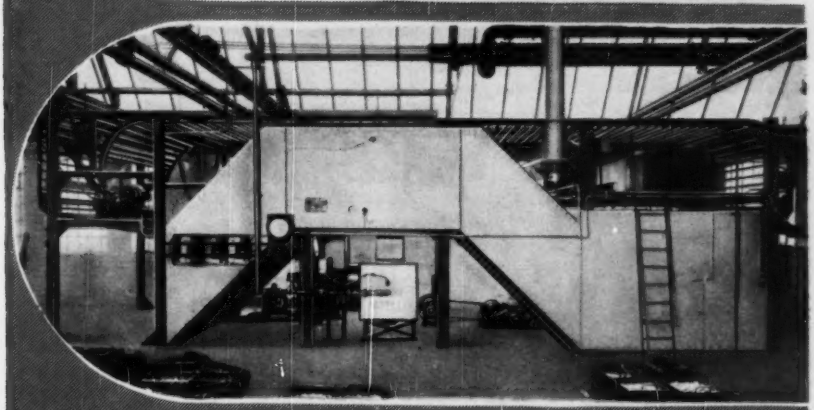
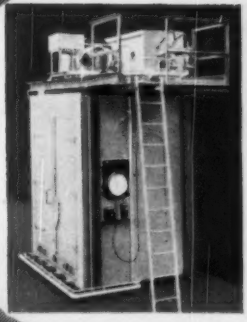


FOR
INDUSTRIAL
OVENS
OF ALL TYPES





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All enquiries whether large or small have the full consideration of

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J.I.E.

gas to pass to the burners again.

Adjustments of the regulator allow for the control of steam pressure and adjustment of the spring load. By these means the steam pressure can be regulated.

This equipment, manufactured by Controlled Flame Boilers Ltd., is constantly in use in the factory, but its efficiency is measured mainly by the fact that it is possible for the workers and the engineer to forget its existence. Foot pedals go down releasing the steam for irons and for the Hoffman pressing machines which are also extensively used.

Preference for Gas

Away from the factory is the canteen. Here an all gas kitchen is used for the preparation of meals.

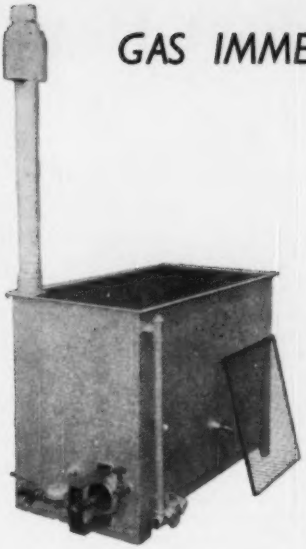
The organiser for Wales, for the firm of caterers who keep the workers in this and many other factories well fed, was preparing the mid-day meal. She was emphatic in her preference for gas in large scale catering. Steamers, fryers, grill, potato boilers and all ovens in the neat pin-clean kitchen are gas supplied.

She further explained that even if the gas supply should fluctuate or fail altogether, one of the advantages it had over other methods was that some warning was always given, and furthermore it was possible to maintain sufficient heat in such an eventuality to ensure that food was not entirely spoiled.

Returning to the factory our reporter was prompted to ask the engineer a further question concerning the boiler. Surely, if it were so complex in operation a good deal of regular maintenance was required. He disagreed, in the first place, that there was any complexity in the construction of either the boiler or the regulator. On the contrary simplicity of construction made for extreme accuracy. He pointed out that the limit of accuracy on regulators fitted to steam raising units was actually plus or minus a fraction of one pound per sq. in. steam pressure. Maintenance was, of course, necessary in so far as no piece of machinery could be expected to work without care, but this, he explained, was a very different matter from complexity of construction or operation. For example it is only necessary to shut off the main gas cock and steam stop valve to put the plant out of commission.

So the factory works smoothly through each day, confident that its "life-blood"—the steam in the pipes—will be there whenever it is required.

Operators using the steam-electric irons. Steam is used for opening seams, among other operations



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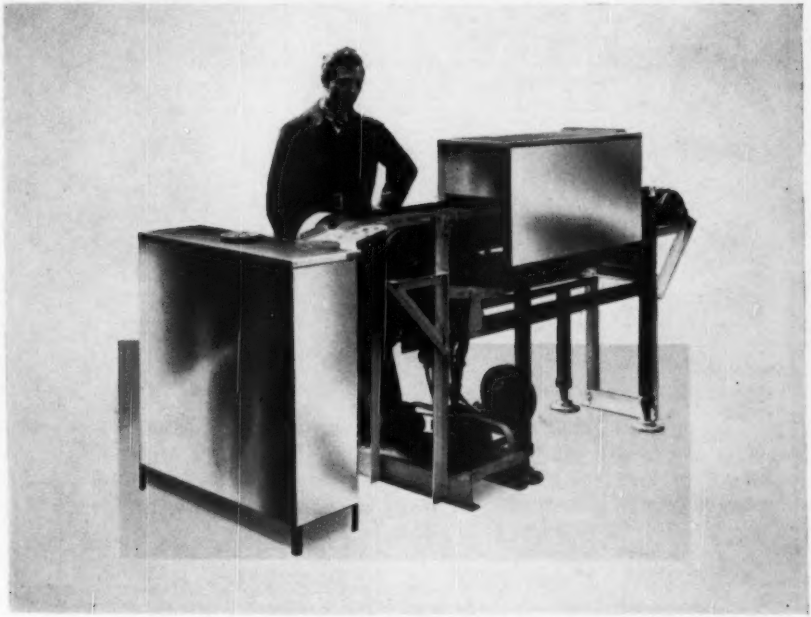
High Intensity Radiant Heat Tunnel

A new development by Radiant Heating Ltd.

A COMPLETELY new development in drying and stoving techniques, which reduces the length of tunnel to about one-twentieth of what is necessary in normal practice, has now been developed. This is the new high intensity radiant heat tunnel of Radiant Heating Ltd., which, by reason of the saving in time and fuel which it effects, will be found to give considerable saving in operating costs.

Our illustration shows a working unit suitable for demonstration and testing purposes, fitted with a variable-speed conveyor, giving speeds varying from 5 to 20 ft. per minute as required. The scientific principles underlying the success of the high intensity combustion technique employed in the tunnel are the maximum use of additional radiant heat from the short wave-band of the electro magnetic spectrum, together with the longer wave infra-red radiations usually employed. With surface combustor temperatures in excess of 650° C., short-wave radiant energy is brought into play, so that articles can be dried and stoved in seconds, whereas, by previous methods using long-wave emitters, several minutes were needed for similar processes.

The tunnel opening of the demonstration unit is square in section, 12 in. wide by 12 in. (nominal) height, a variable speed 11¼ in. British wire wedge conveyor running through at preselected height from the combustor units. Two 10⅝ in. by 7⅝ in. No. 1 type surface combustion units are fitted in the roof of the tunnel to give 24 in. of direct radiation on the conveyor when the latter is at 5⅛ in. from the radiant heat source. The tunnel is 3 ft. 3⅜ in. long, a short air-sprayed flashing chamber preceding the radiant heat zone. Mounted at 6 ft. 4 in. centres, the conveyor is run through the tunnel on a guide tray at the required speed. Fan air is used to inspire the necessary gas through special gas-air mixers, the total gas



The demonstration unit of the new high intensity radiant heat tunnel for drying and stoving by Radiant Heating Ltd.

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on industrial
gas appliances
ROTARY METERS

- Low in cost.
- Small in size.
- Negligible pressure loss.
- Unaffected by pressure variations.
- Easy to install.
- Low in maintenance.
- Prompt delivery.
- Accurate from 1/10th up to full load.

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consumption being 0·6 therm per hour. A ¼ h.p. motor drives the conveyor, and together with the 0·05 h.p. fan motor, is fitted at the base of the conveyor supports, where reduction and speed-change gearing are also located. Provision is made for raising and lowering the tunnel in relation to the conveyor by means of screw jacks in the tunnel legs.

Light metal parts or articles, after spraying and flashing, can be fed through at the rate of thousands per hour; light castings, such as junction boxes, can be stoved inside and out; or wet materials can be dried in trays or in strips. Improved thermal efficiency over older methods arises from the higher speed of heat transmission attained by the employment of additional short-wave radiation together with longer wave radiation from the high temperature carbon dioxide and water vapour formed on the surface of the combustor units.

Mr. W. Hawkyard, general manager, Tottenham Division, Sir John Stephenson, chairman, Eastern Gas Board, and Mr. F. T. Brookes, secretary and assistant general manager, Tottenham Division, take a close interest in the icing of "Mr. Therm" on a cake at the Gas Bakery which was a feature of the "Enfield Can Do It" Exhibition

Gas Bakery the main attraction at Enfield Exhibition

TOTTENHAM Division of Eastern Gas Board played a prominent part in an eight days' exhibition held recently by traders and manufacturers of Enfield (Middlesex), under the title of "Enfield Can Do It."

The gas stand attracted a great deal of attention. Designed and erected by the Divisional Studio, it was satisfactory to hear the favourable comment on the high quality and attractiveness of their work.

Excellent business was done in the sale of appliances, particularly cookers, and the value of the stand was also reflected in the numerous enquiries at local showrooms the same week.

Four rooms and an adjoining corridor accommodated the gas exhibits. Cookers formed one unit, space and water heating appliances and a home laundry a second, a working bakery a third, and a cinema and demonstrations theatre a fourth. A cash and enquiry desk at the end of the corridor effectively completed the general layout.

The working bakery was undoubtedly the big draw, not merely of the gas stand, but of the entire exhibition. Each day, and particularly in the evenings, the public packed into the room, and the local baker who joined in this special effort could have no complaint about business done. Large iced cakes were in demand, and smalls were sold by the thousand. Often the problem was to keep the public on the move. Ellerstyle Engineering Co., co-operating with the Divisional Industrial Section, erected one of their latest gas-fired steam tube confectioners' ovens.

Sir John Stephenson, C.B.E., J.P., chairman of Eastern Gas Board, spent some time at the stand, and was accompanied by officials of Tottenham Division.

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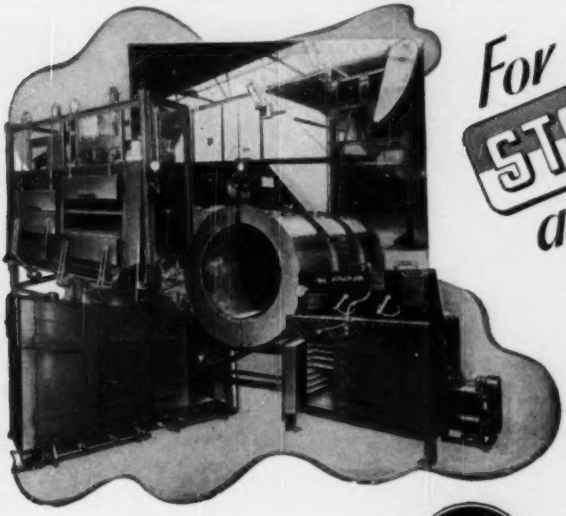

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Clinton-Wall

Developments at Etruria Gasworks

ON a recent visit to Stoke-on-Trent, Sir Edgar Sylvester and Col. H. C. Smith (chairman and deputy chairman of the Gas Council) accompanied by Mr. G. le B. Diamond (chairman of the West Midlands Gas Board) toured the Spode factory of W. T. Copeland and Sons Ltd., Stoke, and inspected the Etruria gasworks. This was followed by a luncheon, at which the guests included Sir Ben Smith (chairman of the West Midlands Division of the National Coal Board), Sir Francis Joseph, Bart., the Lord Mayor of Stoke-on-Trent (Alderman Dr. A. P. Spark), the Mayor of Newcastle (Alderman W. Evanson), officials of the British Pottery Manufacturers' Federation, and representatives of the gas industry.

Outstanding Enterprise

Proposing the toast of "The Lord Mayor and City of Stoke-on-Trent," Mr. Diamond referred to the district's varied industries. He said that the pottery industry now had an output of £32,000,000, compared with £13,000,000 before the war.

Mr. Diamond named the gas undertaking as the Stoke-on-Trent Corporation's outstanding enterprise. Its expansion of output and its sound policy of low tariffs had been of outstanding benefit to the expansion of their staple industry.

Gas Aids Industry

Speaking of radical changes over the past twenty years, which could not have been accomplished without plentiful and cheap supplies of gas, Mr. Diamond said that following the first tunnel kiln to be fired by town's gas in 1932, the gas used for the ceramics industry grew to 36 millions in 1933, but it was now just 100 times greater at 3,600 millions for the past year, when they had approximately 160 tunnel kilns using town's gas.

Remarking that the West Midlands Gas Board were now pursuing, as diligently as possible, a further extension at the Etruria gasworks, expected to cost £1,500,000, adding a further eight millions per day to the capacity of the works, Mr. Diamond said that when the scheme came to fruition it was hoped to be able to give more plentiful supplies of gas.

A section of the Gas Council stand at the recent British Industries Fair, showing a display of pottery in the manufacture of which gas has been used. On the left is a bushing insulator weather shield, the glaze of which was gas-fired at 1,300° C.

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FOR ALL FUELS

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★ **The NEW Linforth-Sismey Recuperator**

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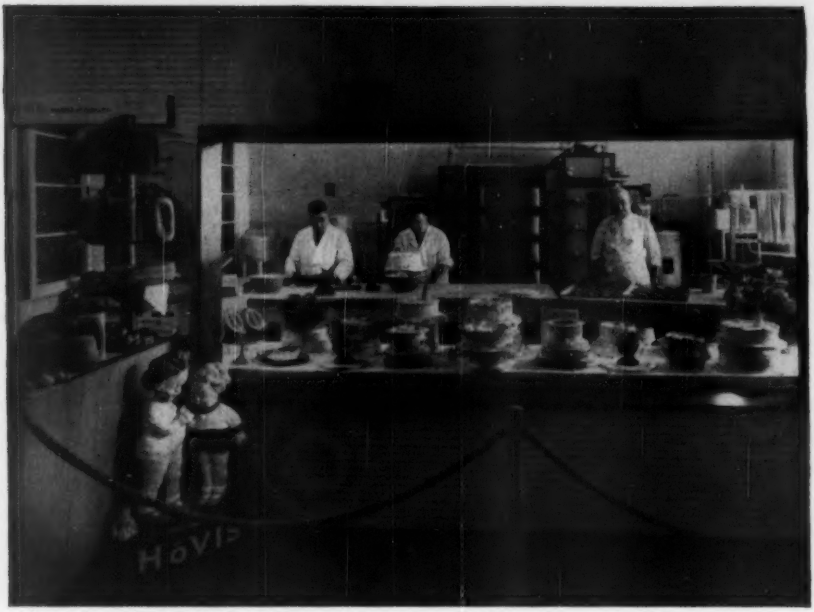

View of the Gas Bakery which was the main exhibit on the stand of the Tottenham Division of the Eastern Gas Board at the recent "Enfield Can Do It" Exhibition.
See article page 304

A GIBBONS CELEBRATION

ON Saturday, 20th May, Gibbons Bros. organised a celebration trip to commemorate the hundredth kiln which they have installed since the end of the war.

The trip was a great success, beginning from Dudley at 8 o'clock in the morning and leisurely wending its way through Bromsgrove, Alcester, Evesham, Broadway to Stow-on-the-Wold. Here that quaint part of England was inspected and the architectural beauties of the local inns was thoroughly studied both from inside and out! Thence the parties proceeded via Burford, Bibury to Cirencester, where they had lunch. Thence to Cheltenham and on through Tewksbury to Worcester for dinner at the Pack Horse Hotel.

In the programme it says "10.15 p.m. (perhaps)—leave Worcester for home."

It turns out now that Gibbons Bros. have installed 3·37 miles of kilns in the past five years.

Of the 100 kilns, over 50 were fired by town's gas or producer gas, and against the 62 installed in the Stoke-on-Trent area, the rest of the United Kindom, including Northern Ireland accounted for 21, and the export drive 17.

Burners.—We have received catalogue leaflets from W.S.A. Engineering Co. Ltd., 5-9 Hatton Wall, London, E.C.1, dealing with their specially developed pin point burners for use in scientific glass blowing with gas, air and oxygen.

The orifice diameters may be varied in the 1 in.—1¼ in. standards from 0·02 in.—0·062 in. to suit customers' requirements.

Information is also given on the standard Marshall burner, containing eight holes, with a 0·1 in. pitch which applies to the distance between the centres between the burner jets.

A recent development has been their needle valves for precision adjustment.

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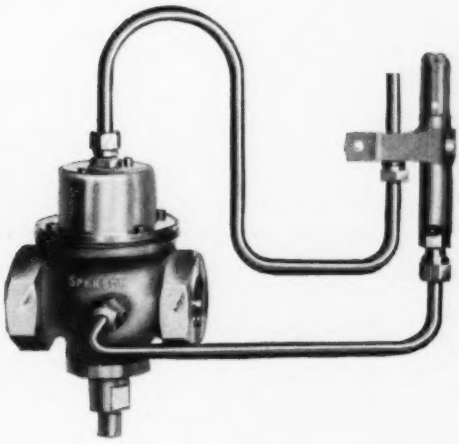
G805 THERMO-MAGNETIC SAFETY CONTROL PILOT



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This latest addition to the wide range of highest quality 'Sperson' Gas Equipment, like its forerunners, is made entirely at our own works and under our own supervision and control.
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Pot capacities: 300, 500 & 1,000 *lb.* *These furnaces are also made without bottom drain.*

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